Acute Exposure Guideline Levels
AEGLs

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Mandate

• Clean Air Act mandates EPA regulations
  – Prevent accidental releases
  – Reduce severity of releases
  – 1990 amendments: section 112(r)

• Risk Management Plan
  – Determine the maximum distance that would result in the exposure to the toxic endpoint (Level of Concern – LOC)
  – 1 hour ERPG-2 values are the default
Since 1996 the EPA has convened meetings of a National Advisory Committee for Acute Exposure Guideline Levels (AEGLs)

Sponsored by the Committee of Toxicology of the National Research Council and National Academy of Sciences

Application: “Once in a lifetime short term exposures” for the general public
AEGL Health Outcomes

- AEGL-1  Notable discomfort, irritation
- AEGL-2  Irreversible or serious, long lasting effects, impaired ability to escape
- AEGL-3  Death or life threatening
- Same as ERPG health endpoints
AEGL Time Periods

- Levels are set for 5 time periods
- 10 and 30 minutes, 1, 4 and 8 hours for each health outcome
- Total of 15 levels per chemical
- ERPGs are only set for 1 hour
AEGL Application

- General population including infants, children, asthmatics and other susceptible groups

- Unlike occupational recommendations, intended for once in a lifetime exposure
CBRN Standards Development

NIOSH presentation for
APR Escape Respirator
Chemical Air Exposure Levels Continuum*

- **Single exposure**
  - mg/m³
  - LC50
  - LC LO “1%”
  - A EGL-1
  - A EGL-2
  - A EGL-3

- **Terrorist attack; Catastrophic release**
- **Industrial operations**
- **Multiple/continuous, long-term (e.g. emissions)**
- **Lifetime exposure**
  - ug/m³

- 15 min
  - 4 x per day worker “STEL”
- Daily 8-hr worker TWA “WPL”
- Ambient air - general population lifetime “GPL”

*not to scale for any specific chemical - general representation
Relationship of AEGLs to other values

Community

Single exposure mg/m3

Once in a lifetime exposure

AEGL-3 Lethal

AEGL-2 Escape

AEGL-1 Irritation

Lifetime exposure ug/m3

General Population

Occupational exposure (usually repeated exp.)

LC-50

IDLH Escape

15 min. STEL

PEARL/REL/TLV 8 hour TWA
AEGLs compared to Occupational values

- AEGLs may be higher since they are intended for a single once in a lifetime exposure
- AEGLs may be lower for general population
- AEGL data is overwhelmingly single dose
Relationship of AEGLs to other values

Community
Once in a lifetime exposure

AEGL-2
Escape

AEGL-1
Irritation

Lifetime exposure
ug/m³

Single exposure
mg/m³

Occupational exposure (usually repeated exp.)

15 min.  PEL/REL/TLV
STEL  8 hour TWA
Application of AEGL values in the NIOSH CBRN respirator process

- AEGLs are different from most other recommended values
  - AEGLs and ERPGs are designed for a single *once* in a lifetime exposure to the general public

- Clear statements on limitations of AEGL and ERPG values must be included when they are used
Application of AEGL values

• AEGL-2 values are the threshold for the inability to escape or irreversible injury
  – Clear statements on potential health effects
  – What are the implications for setting inside the respirator values in the range of AEGL-2 values?
  – Notification of CBRN respirator users of potential health effects

• Close examination of data and rational for determining AEGL-2 values
Caveats

Primary Controls, even for emergencies, is NOT reliance on “safe” recommended levels

- Control Exposures; hierarchy of controls
- Substitution
- Pollution Prevention (minimization of storage volume)

Need multi disciplinary efforts in Risk Assessment

Toxicologists, Physicians, Epidemiologists, Industrial Hygienists, Statisticians, Engineers
Further Caveats

• “Intended to be used as planning tools”
• “when an actual chemical emergency occurs, there often is no time to measure airborne concentrations”
• “Not to be used as safe limits for routine operations or definitive delineators between safe and unsafe exposure conditions”

(all from AIHA, ERPG handbook, 2000)